

# **IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT SYSTEM IN THE UNIVERSITY OF GUANAJUATO: OBSTACLES AND CHALLENGES**

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## **INTRODUCTION**

Several decades ago, the meaning and use of the term “environment” had already been transformed into “Environmental Problems.” In fact, new generations have grown up in this reality, breathing, drinking and feeling the effects that pollution causes and the deterioration of our environment, identifying these situations as normal and daily. This factor, joined with the predominant culture of consumerism, destruction and death, place our civilization in a severe crisis, where the challenge consists in recapturing the direction of our lives, with those values that give a new sense to our "home", the planet Earth and its inhabitants, including the human beings, that day by day we are more vulnerable to disappear forever.

The strategies to face this challenge, have to come from and to be reinforced by all the sectors and members of the complex society in which we live. For example, the implementation of Environmental Management Systems in companies, organizations and institutions in all the countries, including ours. The results that are obtained when working with this methodological tool are excellent, since a rational and efficient use is achieved in the management of resources like water, energy and paper, as well as consumption of “green” products and an total management of waste, among other aspects. These actions that bring environmental, social and economic benefits, reinforce a new culture of respect and affection toward our environment.

## **ANTECEDENTS**

The construction process of the Environmental Management System, EMS, began in June of 2001 with the signing of an agreement between the University of Guanajuato (UG), the Institute of Ecology and the Bureau of Environmental Protection of the State of Guanajuato. Both government agencies related to environmental administration, provided the UG, during the initial stage of the process, support and consultation, through the Institutional Environmental Program of the UG, PIMAUG, a university department in charge of promoting, coordinating and advising the internal process of implementation of the EMS in the Academic and Administrative Units.

This way, the University of Guanajuato is the only Educational Institution of the State that is part of the State Technical Committee of the EMS. This society-government figure is conformed mainly by State government agencies that, like the UG, are committed to incorporate this model of environmental administration.

Regarding the internal organization of the University, the then Rector of this Institution requested the Academic and Administrative Directors the appointment of a Coordinator of the EMS for each Unit. The former was done via the PIMAUG and with the objective of supporting and guiding the coordinators in the design of the sub-programs of the EMS that would be implemented gradually, as well as fomenting the formation of an institutional network of Coordinators of the EMS, to share their experiences and to look for an effective collaboration, mainly in the University Campuses, in those where two or more Academic Units share spaces and activities.

For that reason, a Methodological Guide was elaborated for the Process of Implementation of the Environmental Management System of the University of Guanajuato, elaborated by the PIMAUG, with the focus characteristic of an Institution of Higher Education, and the diversity and plurality of activities that are carried out there. This Guide was presented to an important number of Coordinators of the EMS, in April of 2003, date that marks the formal beginning of the implementation of the EMS in the UG.

## **METHODOLOGY**

### **Environmental Management System of the University of Guanajuato (EMS-UG)**

The implementation of the EMS in our University has as main purpose to allow the university community to have a responsible environmental program, promoting a rational administration of all the academic and administrative activities that are carried out daily. The World summits that have been held in recent years have made it very clear that the role that Institutions of Higher Education have before this environmental challenge, is to build outlines where one feels and lives the knowledge, faculties, attitudes and values that involve environmental "knowledge" and "being". In this sense, the commitment of the UG when implementing the EMS, is to transform it into an environmental model of education and behavior, a commitment that represents a challenge that cannot wait, and one that should involve all of us, as a community, in a responsible and committed way.

### **Objectives, Benefits and Characteristics of the EMS - UG**

The general objectives of the EMS are the following:

- To promote in the university community and in the society in general, a respectful behavior toward the environment, using Environmental Education as a primordial tool,
- To promote an environmentally efficient administration, that is to say, to have a rational use of the resources and a reduction in the negative impact of our activities on the environment that help to preserve the natural resources and to reduce the contamination, and
- To create and strengthen an environmental consciousness

Particular objectives of the EMS:

- To promote responsible consumption of resources such as electric energy, water and paper, among others,

- To encourage the separation, the re-use, the recycling and the valuing of non-hazardous solid waste,
- To manage and to control hazardous waste appropriately, as well as to channel them to their treatment and final disposition, and
- To foment the consumption of products that have a lesser impact on the environment, that is to say, those denominated “green purchases”

**Benefits of the EMS:**

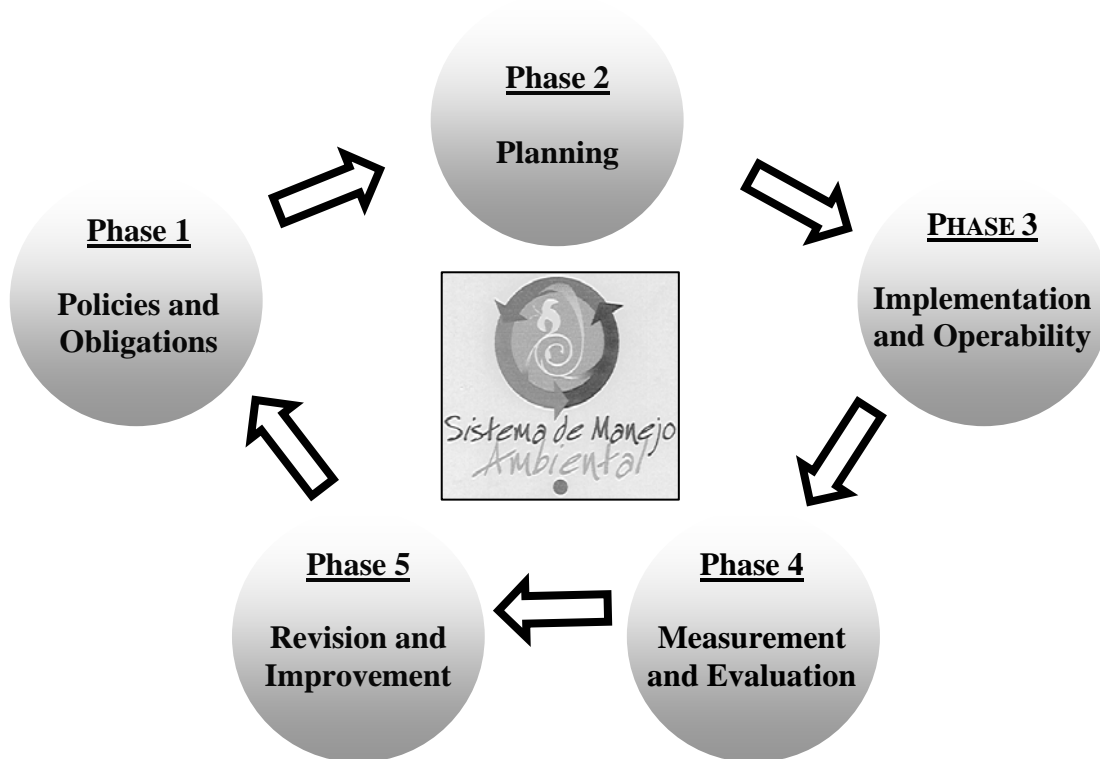
**Environmental.** To reduce the exaggerated consumption of resources and the generation of waste, achieving a lesser negative impact on the balance and harmony of our environment

**Social.** To offer society a better quality of life, through the promotion of a new environmental culture

**Economic.** To reduce consumption and operation costs, and to focus these savings in the implementation and development of the EMS

**Characteristic of the EMS:**

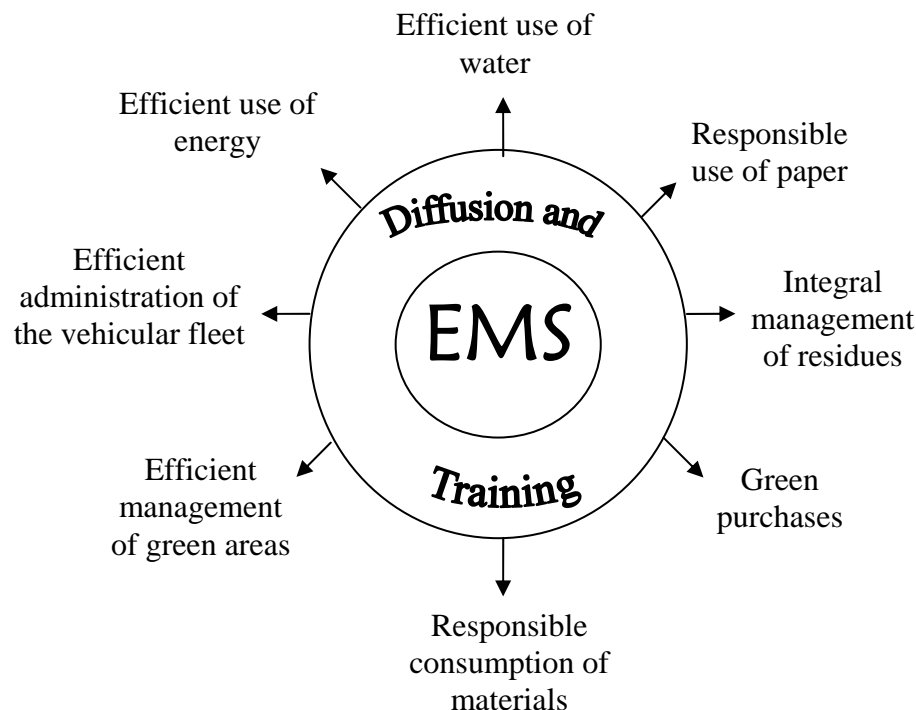
- It is a cycle of continuous improvement, with a focus that goes from “corrective” to preventive. The phases that form it are:



**Figure 1. Phases of Implementation of the EMS - UG.**

- It is a dynamic process that involves the whole university community, since we all generate some impact and only by working as a team will advances be achieved,

- It has behavior indicators to measure the results and achieve improvements,
- Some factors that intervene in the implementation process are: information, culture, normative framework and technology, and
- It will be formed by sub-programs, based on activities that are carried out in each Academic and Administrative Unit, and they are:



**Figure 2. Sub-programs of the EMS - UG.**

### **Chronology of the Implementation Process of the EMS - UG**

The construction process of the EMS began in June of 2001, as previously mentioned, starting from the signature of an agreement between the UG and government institutions related to environmental management, to have backing and institutional support, and the possibility of an exchange of experiences.

During 2002, the Institutional Environment Program offered a series of workshops, where authorities and the academic and administrative personnel of all the Units were invited to see the project, but mainly to make it their own, because only that way can it advance to its consolidation. Starting at this moment, the advances and results obtained in the different Units have been very varied. Some have established or they are in a process of establishing strategies and actions to have a responsible use of resources, while in others they haven't even begun this important process of involving and adding the efforts of the whole community, to preserve the natural resources and to reduce the negative impacts that our daily activities have on the environment.

For these reasons, and to properly design the sub-programs of the EMS that have to be implemented in each Unit, at the end of the year 2002, as previously mentioned, the Rector of the UG requested the appointment of a Coordinator of the EMS for each Academic and Administrative Unit. In April of 2003, the first meeting of Coordinators of the EMS was carried out to present this system, and to analyze the Methodological Guide elaborated by the PIMAUG, a guide so that each Unit can begin the respective implementation process. In this sense, it was recommended that those Units that share physical spaces with other Units (Campus) work in a combined and coordinated way, with the objective of avoiding duplicities and to obtaining better results.

From that moment, there have been numerous meetings with the with the specific objective to begin or continue the process of Diagnosis and Planning, since only this way is it possible to establish concrete goals, according to the reality, priorities and possibilities of each Unit.

## **RESULTS**

The EMS consists, as previously mentioned, in diverse sub-programs. The implementation of all of them simultaneously would be extremely laborious, and would need at least one person dedicated exclusively to the EMS, full-time, in each academic Unit, and probably part-time in the administrative Units, depending on the size and complexity of the same. It would also imply designating important quantities of economic resources, for which the academic Units and office workers are not prepared, and they were less prepared when this process began in 2001.

The institutional implementation of this type of EMS in Mexican universities, and probably more still in the public universities, is quite recent, and therefore requires significant changes to the interior of the same. The university academic and administrative structure do not facilitate the implementation of this type of EMS, and if we added it the important shortage of qualified personnel and economic resources, even for the substantive functions of the university, it is possible to verify that this type of processes represents a true challenge, hard work, and very frequently in against the current, since it goes against the institutional and individual practices and tendencies.

In the case of the UG, this challenge is even bigger, since it is a Public Institution with a wide trajectory of more than 270 years from its beginnings as a State College. Also, it is a university with around 22,000 students, with nearly half being of high school level, and whose faculties, institutes, centers and schools are spread throughout the whole state, in 10 municipalities. It means it that the term 'campus' practically is not applied, except for a few exceptions, and the departments only exist in the interior of the faculties, or in the few existing campuses. This dispersion of the academic Units has conferred them a certain autonomy that has its positive and some negative aspects.

For the above-mentioned, in what refers to the EMS, although it is an institutional process, the adoption of the same has depended in good measure on the priority that each academic and administrative Unit has decided to give it. In fact, the process of implementation of this system has followed a very particular course in each Unit, since the starting point and the

evolution of the process have depended on diverse internal factors for each, such as: the support of the administration, the readiness of economic resources, the knowledge of the topic of the coordinator of the EMS, his/her capacity of convincing the director, leadership to involve the academic and administrative personnel and the students in the process, creativity, and something very important, disposition to the change and even to the break from structures and customs, being this factor decisive for a good beginning of the EMS.

The above-mentioned gives us an idea how complex the process of implementation of the EMS in this university has been and is, which is surely common in most of the universities of our country. This complexity gives us an idea of the diversity in the advances, results and perspectives, making it extremely difficult to make a general evaluation of the university. It is because of this that the form in that the results will be presented in this work is not conventional. Firstly the sub-program of Total Solid Waste Management will be approached, and particularly its advances on two University campuses, the Central Building of the UG and the UCEA campus, the latter being of recent creation and still under construction and growth. Later on a successful case will be presented-that of the Official Preparatory School of Irapuato, with important advances in the implementation of the EMS and the effective involvement of a significant number of students.

The presentation of these advances will give a general panorama of the current situation of the EMS in the UG, of the experiences that, though some of them have been negative, have still been of great utility, of the strengths, and of the opportunity areas, of the challenges and the perspectives. This panorama will be of great utility for the reader, since it will allow on one hand to carry out a comparative study with the experiences in its educational institution, and on the other, and in function of the advance that in this institution has, will allow for learning from our experiences and trajectory, which is one of the fundamental objectives of this work. The possibility to know the problems which other Higher Education Institutes in our country have faced when implementing EMS, the form in that they have resolved it, and the progress that these have had, represents an enormous wealth, and an important source of information for the Educational Institutions, more still in a country like ours where the EMS have been oriented mainly to government agencies, or to industry, leaving the challenge in Higher Education Institutes to be pioneers in the creation of our own frameworks.

#### **SUB-PROGRAM OF TOTAL SOLID WASTE MANAGEMENT: EXPERIENCES IN TWO UNIVERSITY CAMPUSES**

In August of 2002, the UG, through the PIMAUG, with significant support from the Rector, formally began the sub-program of Total Solid Waste Management, acquiring containers for the separation of the same, to be located on two university campuses. The first one is the Central Building (CB) of the UG, where the majority of the administrative offices are, as well as two Academic Units, the Faculty of Law and the School of Plastic Arts. It is a property that receives a great quantity of university students and visitors permanently, of enormous historical value, symbol of the University and of the city of Guanajuato, a World Heritage site.

The second is a new campus that began its operations in that month, congregating 3 faculties with a large number of students, the Faculty of Industrial Relations, the Faculty of Accounting and the Unit of University Technical Studies in Administration, which form the Unit of Economic-Administrative Sciences, UCEA. Given the conditions of both spaces, and mainly those of the new campus UCEA, was opportune to begin the sub-program of Total Solid Waste Management, for which series of 3 containers were located strategically for waste: Organic, Inorganic and Paper and Cardboard, properly labeled, with different colored lids and adapted to the type of waste that must be placed in each one.

The acquisition and placement of the containers was accompanied by the application, again directed to the Rector, from Collection Centers in both places, since the separation of waste, and mainly of the recyclable waste, needs a place where it can be gathered and conserved in conditions of cleanliness and safety, separated, weighed and sent to its stage of recycling, or in the event, to a center of specialized collection for later recycling.

The process for the acquisition of a pre-manufactured building for the UCEA campus, an appropriate place with proper specifications for a collection center, and the adaptation of a space in the CB, as well as the acquisition of three 1-ton containers for each collection center, was long and difficult. One of the reasons was that the University argued that the construction of one or more collection centers in Guanajuato city corresponded to the municipality, and that it was they who were not fulfilling their obligations. Although this argument was valid, we are able to demonstrate to the university authorities that the Total Waste Management did not make sense if we were not capable within the University of separating and collecting recyclable waste, in order to sell them accordingly. An additional argument of great weight is the educational factor. The example that through the Environmental Education the Public University of the State owes its students and the society in which it is immersed. The task of convincing gave fruit and both collection centers were achieved, the acquisition of 1-ton containers, 2 scales—centers that work, albeit partially.

Having begun this whole process without even having the Coordinators of the EMS, and consequently, the project being the responsibility of the PIMAUG, it meant that the professors, students, office workers and custodial personnel did not take this project as their own, with all that it has meant, and whose consequences we continue to see. In spite of the above-mentioned, this experience has represented for us, for the Coordinators of the EMS, and for the university community in general, a process of very significant learning, and as will be appreciated in the following section, there are important advances in the implementation of this sub-program in both university spaces.

### **Advance of the EMS in the Central Building of the UG**

The Central Building, CB, of the UG is a symbolic space for the University and the city of Guanajuato, and at the same time it is a space in which academic and administrative activities are carried, where visitors are received daily, and where the common spaces are very extensive. At the same time it is difficult to identify who is responsible for its care and maintenance, regarding the EMS. Among Administrative Units, and the 2 Academic Units that there are, we have 17 EMS coordinators, with extremely diverse profiles, since the

great majority is the administrative personnel of the university who have had very little contact with the environmental questions. In some cases the coordinators have shown great interest for the training and the diffusion of this information within their Units, being an important element in many of these cases, the previous experience in the waste management, saving paper, energy and water, among other resources, in their homes. The experience and these coordinators' interest have been decisive in, primarily, being identified as suitable people to assume this responsibility, secondly, to take this new responsibility with zeal and will, knowing that the circumstances and the attitude of their colleagues do not necessarily facilitate actions concerning the EMS.

Given the situation of this important and complex space, in the PIMAUG we assigned ourselves to the task of summoning the coordinators to integrate them and to look for frameworks of collaboration, with which the implementation of some sub-programs of the EMS would be facilitated, considering the common areas that particularly refer to Waste Management, have not been attended to properly. Starting from May of 2003, the Coordinators of the EMS of the CB have met with the main objective of carrying out a combined planning of actions. In a general way, the participants have suggested that work committees be formed for those sub-programs of the EMS that are intended to be implemented. In this sense, a proposal to conform and to operate the Committee related to the sub-program of Total Solid Waste Management (TSWM) already exists. Some of the main functions that this Committee will carry out are:

- To coordinate, jointly with all the Units of the CB, the necessary adaptations to strengthen the sub-program TSWM,
- To propose internal policies for the good development of the TSWM,
- To motivate the personnel that works in the CB, through a specific program of sensitization, training, diffusion and education of the TSWM,
- To be responsible for the pursuit and systematic evaluation of the TSWM,
- To carry out their own work sessions for internal pursuit,
- To work in combined activities with the other committees of the EMS, and
- To communicate to the personnel of the CB, to the other committees, department heads and to the community in general of the advances, events and challenges of the sub-program TSWM.

Regarding the organization of the Committee, this will be conformed by:

- A Representative whose function will be to serve as liaison between the committee and the PIMAUG and the other committees.
- A Secretary whose function will be to take the memoir of the activities of the committee in a documented way.
- Minimum one Coordinator of the EMS for each floor of the CB, and in the cases where it is necessary, two or more.

It is expected that no later than June of 2004 the committee is conformed and the proposals that have been offered to improve the separation and collection of waste in the CB are reconsidered.

## **Progress of the EMS in UCEA**

The Unit of Economic-Administrative Sciences is made up of three academic Units: the Faculty of Industrial Relations, the Faculty of Accounting and the Unit of University Technical Studies in Administration. Each one of them with an EMS coordinator, and in this case, practically since they were designated, the three coordinators work jointly. Though the Units maintain a certain independence and the shared spaces, regarding classrooms and offices, they are few. The common spaces are the corridors, stairways, patios, gardens, bathrooms, cafeteria, and some multiple-use rooms, such as auditoriums. It is important to point out that the integration was due to the will and disposition that the three coordinators have manifested, and that in spite of the not always favorable circumstances, they have maintained.

This team of coordinators has faced, as in the previous case of the CB, the existence of the three types of containers for the separation of waste and of a collection center in the form of a pre-manufactured building. Although advances have been made in some other sub-programs, the one that has been high-priority is the TSWM. This campus has some particular characteristics. For example, it is in the high part of a hill, where the wind is usually intense, and this has caused the location of the containers to be strategic; besides that, most of the common spaces are outdoors, which complicates this location even more. Each Unit has its custodial personnel, and in spite of having a single administrative secretary for the campus who is responsible for this personnel, the team work and collaboration in the tasks corresponding to the EMS, on behalf of the custodians, has not been achieved. This same administrative structure prevents the coordinators of the EMS to give indications, or to request support, to a custodian that doesn't belong to that Unit, complicating the custodial personnel's already difficult collaboration regarding this sub-program.

In spite of the characteristics of UCEA, the conviction, the arduous work and the capacity of the coordinators to involve more students each semester to carry out their social service inside the EMS, they have had important advances that follow. This campus has a Internal Committee of the EMS, integrated by a person in charge in each Academic Unit, that is to say, the coordinator of the EMS, besides administrative personnel of each Unit. The functions of this Committee are: planning of semester activities; coordination of students with Social Service scholarships; management of economic resources in the Units; and generation of revenues for activities of the EMS.

The committee meets once per week to evaluate and to give pursuit to the planned activities involving the students in some of these sessions. In the first semester of 2003 there were 19 students involved, and in the second of 26. The main actions that have been developed from the beginning of 2003 until now, are described below.

Diffusion and Training. Meeting with professors and administrative personnel; discussions on information and sensitization to all students of UCEA; Social Service-personalized visits in cubicles and administrative offices, and Mural Newspaper with information of the EMS.

Sub-program of Total Solid Waste Management. Placing of the containers in strategic areas, disposition of waste in the collection center: paper, cardboard, piles, toners, aluminum cans and plastic bottles.

Sub-programs of Efficient Use of Water and Energy. Placing of posters in classrooms, offices and bathrooms for the saving of energy; placing of signs in bathrooms for saving water .

Sub-program of Responsible Use of Paper. Collection in administrative offices and cubicles; collection, classification and disposition of the paper in the collection center. Sale of paper, cardboard and newspaper to a collection center in the municipality.

Sub-program of Efficient Management of Green Areas. Contribution of plants and trees on the part of students that did not fulfill their social service; planting of plants in gardens and green areas; placing of allusive signs promoting the care of the plants.

The main challenges and opportunity areas identified by the internal committee of UCEA are:

- To achieve the active participation of the directive, professors and administrative personnel,
- To increase the custodial personnel's support,
- To strengthen and to increase the sensitization of the students and their participation,
- To improve the communication and diffusion of information regarding the EMS, as well as the advances of the same,
- To facilitate the separation of the waste with the placement of labels on the containers,
- To assess the value of the waste to generate revenues that support the development of the EMS, and
- To increase the saving in the paper consumption, water and electric power, mainly.

#### **A SUCCESSFUL CASE: THE OFFICIAL PREPARATORY SCHOOL OF IRAPUATO**

The implementation of the EMS in this School, better known as EPI, represents an example to follow for many academic Units, and even educational institutions. It is a school with 1800 high school students, with a wide array of patios and green areas, numerous buildings, classrooms, laboratories, bathrooms, offices, and cafeteria, which is concessioned. The initial circumstances for the implementation of the EMS were not in fact the most favorable, due to the support of the administration, and the conditions of consumption of resources and cleaning, among other factors, of the school. The persuasiveness and perseverance of the EMS coordinator favored the participation of the students, achieving visible results that later on favored the support of the administration, and of a growing number of professors and administrative personnel, displaying outstanding, active participation of the students, in so much as the quantity of students involved, and the quality, creativity, responsibility and commitment that they have demonstrated.

The EPI is an example in the sense that, through results, even if these are not very important, it is possible to get the support and recognition of the administration and of the personnel in general, and through the leadership and example, it is possible to have real and constant support of the students. The students are in fact the main group of support, because the knowledge of the EMS, of their sub-programs and benefits, and the setting in practice of the diverse actions, causes a real change in their habits and customs, transforming them in the best promoters of the EMS, within their school, and at home and immediate surroundings. The sensibility of the youths, their creativity, capacity and disposition to the change, combined with the appropriate education and accompaniment, are the essential ingredients for the success of the EMS in an educational institution, besides other elements, such as the disposition and economic support on the part of the administration. Following are briefly presented some of the advances that the EPI has had, thanks to the work of an important number of people during the last two years.

Environmental Perception. A questionnaire was elaborated, applied and analyzed to know the environmental perception regarding the EPI. A significant number of professors, students and administrative personnel answered this document. The analysis of the survey shows that the population's important percentage perceives that the consumption of electric power, water, paper, cardboard and of junk food is from important to very important, and that the generation of plastic and other waste, such as polystyrene and some non-recyclables, is important.

Diffusion and Training. Several Mural Newspapers have been created. The campaigns of sensitization have been instituted "Put on Your Bows" (*Ponte Tus Moños*) that consist in assigning a color to each indicator of a causal problem of environmental impact, and to make the diffusion with posters presenting the meaning of the color of each bow, as shown in the following: Blue: care of the water; Green: care and beatification of the spread out areas; Red: care to not throw out waste; White: joining the brigades of paper collection; Yellow: saving of the electric power; Black: invitation to not smoke.

Participation of the Students. Brigades have been formed by students doing social service involved in the EMS, who visit each classroom during both shifts and invite volunteers to support the campaign. The students have generated many ideas to sensitize their classmates.

Formation of the Environmental Committee of the EPI. The Academia approved the formation of the Environmental Committee, made up of: 8 teachers (including the academic secretary), 1 representative from the shift supervisors, 1 representative from the secretaries, 1 representative from the custodial staff, 2 6<sup>th</sup> semester students, 2 4<sup>th</sup> semester students, 2 2<sup>nd</sup> semester students, and 1 student representative from the board of directors.

Sub-program of TSWM. The problem of excessive production of solid waste was identified. The main problem resides in the fact that the waste is not deposited in the proper containers. There have been many sensitization campaigns to encourage collection and separation: "Hit the Garbage Can" (*Atínale al Bote*), "To Separate and Recycle, you have to Locate" (*Para Separar y Reciclar, Primero hay que Ubicar*), "Put in some Batteries" (*Ponte las Pilas*), "Make a Fuss" (*Haz Lata*), and the collection of toners. Monthly contests have been organized to distinguish the "cleanest classroom." A space was designated for

the processing of organic waste, and several workshops on the creation of compost, hydroponics and paper recycling have been offered.

Sub-program of Efficient Management of Green Areas. Priority has been given to the beautification of the ornate areas, and to the integration of the university scenery with the surroundings, through the creation of a new open area.

Sub-program of Efficient Use of Water. Measures have been taken for the change of the hydro-sanitary installations of the EPI. The workshop for teachers, "Let's Channel the Water" was given by specialized personnel from the Mexican Institute of Water Technology.

Sub-program of the fomentation of Green Purchases. Promotion has been done to change the consumption habits of students, as well as decrease the production of waste from the sale of junk food in the cafeteria. In this sense, the concessionary has been asked to provide a service that will benefit the quality of life of the students and will care for the environment.

## **CONCLUSIONS**

The UG is a public institution, and an important part of its mission is to respond to the needs of all the communities that belong to this state. Environmental problems in Guanajuato have become more and more important, compounded by other problems with important social dimensions, such as migration and poverty. We can identify some of the sources of the environmental situation in Guanajuato, including the lack of integral studies in biodiversity, of productive projects for rural communities, a lack of awareness of the manufacturing sector and government, and in a large sense, Environmental Education.

In December 2000, a group of 12 universities in Mexico, both public and private, joined in a loose network called "Consortio Mexicano de Programas Ambientales Universitarios para el Desarrollo Sustentable," COMPLEXUS (which means weaving together). What these universities share is the commitment to play a central role in solving some of these environmental and social problems, in conjunction with other sectors and the larger society. Two of the main strategic projects for all of these universities, which have Institutional Environmental Programs, are the incorporation of Environmental Education and the introduction of EMS.

The introduction of EMS in the UG began on June 5, 2001, with the signature of an agreement between the UG and the Institute of Ecology and the Office for Environmental Protection, both from the State of Guanajuato. The incorporation of this type of system in other Higher Education Institutes in the country, and primarily of the COMPLEXUS, has been a deciding factor in the push and growth of the EMS in the UG.

The results that up to now have been presented by the coordinators of the EMS, reveal great heterogeneity that exists in the implementation of the sub-programs of the EMS. This is a consequence of the diversity and plurality of this institution, and of the necessity of an implementation process that is flexible, that adapts to the circumstances and conditions of

each Unit, that is structured according to the activities carried out and to the generated environmental impact. And generally speaking, that it be considered as a long-term educational process. The results are not always easily visible or measurable. However, it is clearly necessary to document the process from the initial diagnosis and in each phase of implementation of the system. It is also primordial to involve the entire university community, for which it is necessary to inform in an opportune and constant manner, as well as gradually train those involved.

The introduction of the EMS in a university requires academic and administrative structures that are more flexible and open than those that exist in our institutions; structures that include the transversity that the topic of environment requires to be completely understood. The challenge consists in transforming these structures so that environmental subjects that form part of all university activities, substantive ones as well as teaching and research, and the administrative activities. The perception of an EMS as something disconnected from the teaching in a chemistry laboratory or in an art workshop, from the policies for materials and equipment purchases by the purchasing department, from the schedules and procedures for the irrigation and treatment with fertilizers and insecticides in the green areas, from the management of the enormous variety of hazardous waste that is generated in the laboratories of chemical research and biology, is precisely the perception we need to transform. An environmental management system is involved with all of these activities.

Because of all the previously mentioned facts, the implementation of the EMS in the UG, despite the errors made and the lack of experience, has become an important learning process those of us involved, in one way or another. It is clear that there is no universal recipe, and that each case is totally unique. We appreciate the advances of the EMS in the UG are due to two factors: the conviction and perseverance of the coordinators, and the enthusiastic and creative participation of the students. The moral and economic support are a consequence of the prior. It is clear to us that the errors along the way have taught us more., and in these times we can boast a network of coordinators of the EMS that in a few years will be capable of working autonomously, minimizing the negative impacts on the environment on a daily practice.

## **BIBLIOGRAPHY**

Aboytes-Figueroa, J. F. (2003). Planificación de Subprogramas del Sistema de Manejo Ambiental. Período agosto-diciembre de 2003. Programa Institucional de Medio Ambiente de la Universidad de Guanajuato.

Balderas-Estefanía, A. (2003). Reporte del Proceso de Diagnóstico del Sistema de Manejo Ambiental. Período agosto-diciembre de 2003. Programa Institucional de Medio Ambiente de la Universidad de Guanajuato.

Juárez-Herrera, F., Cabrera-Ortiz, R. y Súcar-Súccar, S. (2003). Guía Metodológica para el Procesos de Implementación del Sistema de Manejo Ambiental de la Universidad de Guanajuato. Programa Institucional de Medio Ambiente de la Universidad de Guanajuato.

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